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Journal of the Society of Arts.

FRIDAY, AUGUST 3, 1866.

Announcements by the Council.

PROGRAMME OF EXAMINATIONS FOR 1867.

PRELIMINARY NOTICE.

I. The Examinations described herein have been established for the benefit of the members and students of Institutions in Union with the Society of Arts. Such persons are commonly mechanics, artisans, soldiers,* labourers, clerks, tradesmen and farmers in a small way of business, apprentices, sons and daughters of tradesmen and farmers, assistants in shops, and others, of various occupations, who are not graduates, undergraduates, nor students of a University, nor following nor intending to follow a learned profession, nor enjoying nor having enjoyed a liberal education. To all such members and students in the Institutions, and to other persons of the like condition, male and female, the examinations, certificates, and prizes, described in this programme, are open on the general conditions stated herein. Persons, however, who are, or have been, professional teachers or pupil teachers; persons who either are enjoying or have enjoyed a liberal education, or who occupy a higher position in society than those above described, may obtain certificates, but cannot compete for the prizes, of which particulars are given at pages 12 and 13.

II. The certificates are not competed for. They are awarded as records of positive, not comparative, attainment. The prizes are competed for.

III. For the conditions on which persons of a higher grade in society may be examined and receive certificates, but not compete for prizes, see paragraph 4 (D).

IV. The candidates for examination have not to go to a distance from their homes. The examinations are held in all places in the United Kingdom where a Local Educational Board connected with the Society of Arts is willing to make the requisite arrangements.

V. For a list of the Local Boards already formed, see page 609.

VI. For instructions as to the formation of Local Boards and their duties, see page 602.

The EXAMINATIONS are—

- (1.) The Previous Examinations by District Unions and Local Boards for ascertaining the fitness of candidates to present themselves at the Final Examination.
- (2.) The Final Examination by the Society of Arts Board of Examiners, under the supervision of the Local Boards.

PREVIOUS EXAMINATIONS BY DISTRICT UNIONS AND LOCAL BOARDS.

1. The object of these Examinations is to "sift" the Candidates for the Final Examinations, so as to keep

* The following circular memorandum (Gen. No. 331), addressed to the army at home, has been issued:—"Miscellaneous 1 (1865).—The Field Marshal Commanding-in-Chief desires it to be notified that there will be no objection to soldiers, their wives, and families, being permitted to present themselves for instruction and examination at the Educational Institutes in connection with the Society of Arts, on the understanding that they are not on that account to be exempt from any military duty, nor, except in special cases, to be out of barracks after watch setting or tattoo.—By command of his Royal Highness the Field Marshal Commanding-in-Chief, JAMES YORKESCARLETT, Adj. Gen.—Horse Guards, S.W., 11th March, 1866."

back (1) those who are not fairly grounded in the elements of education—spelling, writing, and arithmetic—and (2) those who are not fairly acquainted with the subject or subjects in which they desire to be examined by the Society of Arts, and are therefore unlikely to succeed in that Examination. The sifting in the above-named elementary subjects may be effected at the discretion of the Local Boards; they should examine their Candidates in spelling and writing by dictating to them a passage from an English author for them to write down; in arithmetic by setting them moderately easy questions to work out in the usual manner. The best mode of sifting the Candidates in the special subjects in which they desire to be examined by the Society of Arts is for the Local Boards to examine them therein by means of printed (or written) questions and written answers; but, where a Local Board finds itself without the means of conveniently holding such an Examination in any special subject, such Board may satisfy itself in any other mode, and state simply that it has satisfied itself, that the Candidate is fit to be examined by the Central Board in that subject.

2. The Previous Examinations must be held sufficiently early in the year to enable the proper returns to be made, as explained in par. 6.

FINAL EXAMINATION BY THE SOCIETY OF ARTS.

3. No candidate can be admitted to a Final Examination unless duly returned by a district Union or Local Board as having passed a Previous Examination.

4. Every admitted candidate must be at least 16 years of age.

(A). Members of, or students of classes in, Institutions in Union with the Society of Arts, are examined Free.

(B). Members of, or students of classes in, Small Institutions,* not in union with the Society of Arts, but subscribing one guinea a year for admission to the Examinations alone, are examined Free.

(C). Members of, or students of classes in, "Small Institutions"* not in Union with the Society of Arts, but connected with it through a District Union or Local Board, are examined on payment of a fee of 2s 6d.

N.B.—It will be understood that Candidates coming under the heads (A), (B), or (C) must not be of a higher class in society than those described in par. I. of the Preliminary Notice.

(D). Persons of a higher class of society than those described in paragraph I. (Preliminary Notice), cannot compete for prizes, but may be examined for certificates on payment of a fee of 5s.

5. The Council in every case require the Local Boards to certify whether a candidate should pay this higher fee; and it is earnestly hoped that in any instance where a Local Board has reason to believe that a candidate is or has been a teacher, or that he or his parents occupy such a position in society, or are in such easy pecuniary circumstances as to disqualify him, according to the regulations, for competing for a prize, they will at once, in case of certainty, return him as not competing for a prize, or in case of doubt, communicate with the Secretary of the Society of Arts.

6. A copy of Form No. 2 will be forwarded in February to the Secretary of each Local Board, and must be filled up and returned to the Secretary of the Society of Arts before the 2nd of March. The requisite number of forms No. 4 will then be forwarded, and these, when filled up, must be returned not later than the 18th of March. Each of these forms, when returned, will be numbered at the office of the Society of Arts, and a card for each candidate, with his name and his

* Small Institutions are defined as those which have an income of less than £75 a year.

number, will afterwards be forwarded to the Secretary of the Local Board for distribution, together with copies of the time-table.

7. The printed papers of questions in the various subjects will be afterwards forwarded to the Secretary of the Local Board; details as to the mode in which the Final Examination is to be conducted are contained in the Letter of Instructions (Form No. 6), and members of the Local Boards should make themselves thoroughly acquainted with them.

8. When the Candidates' papers have been submitted to the judgment of the Society's Examiners, certificates of three grades will be awarded, and the names of the Candidates who obtain prizes and certificates will be afterwards published in the *Journal of the Society of Arts*.

9. A Candidate who has obtained from the Society a certificate of the 1st class in any subject cannot again be examined in the same subject; but a Candidate who has obtained a certificate of the 2nd or 3rd class may, on the recommendation of the Local Board, be examined in the same subject, in a subsequent year, without again passing the Previous Examination.

10. A Candidate who, having obtained a certificate in any subject, desires to be examined in some other subject, in a subsequent year, may be "passed" by the Local Board, after an examination in that subject, without re-examination in the elementary subjects; but, in all cases, the name must be returned in the proper form (No. 4).

11. Particulars of the subjects for the Final Examination are given below.

12. The Time-table has been drawn up to meet the general convenience of the Candidates; and *no variation* of it can *possibly* be allowed, so that, in choosing the subjects in which they desire to be examined, candidates must take notice of the arrangements of this Time-table, as they *cannot* be examined in *two* subjects which are set down for the same evening. The days and hours of Examination must be *strictly* adhered to.

13. The Examiners will reject all ill-written, ill-spelt, ill-composed, or ungrammatical papers that may be laid before them.

TIME-TABLE FOR 1867.

TUESDAY, 9th April, From 6.30 to 9.30 p.m.	WEDNESDAY, 10th April, From 6.30 to 9.30 p.m.	THURSDAY, 11th April, From 6.30 to 9.30 p.m.	FRIDAY, 12th April, From 6.30 to 9.30 p.m.
Arithmetic. Trigonometry. Electricity and Magnetism. Light and Heat. Mining and Me- tallurgy. Geometrical Drawing. German. Floriculture.	Book-keeping. Navigation, &c. Conic Sections. Chemistry. Music. Domestic Eco- nomy. English History. Italian.	Algebra. Practical Me- chanics. Animal Physio- logy. Political and So- cial Economy. French. † English Litera- ture. Fruit and Vege- table Culture. Freehand Draw- ing.	Geometry. Mensuration. Principles of Mechanics. Botany. Geography. Latin. Logic and Men- tal Science. Spanish.

† Two Papers of one hour and a half each in this subject are considered as one.

LOCAL EDUCATIONAL BOARDS.

14. Local Boards may be formed wherever the managers of Institutions, or other persons, may be prepared to co-operate with the Society of Arts.

15. Each Local Board must consist of at least three members, and must have a Chairman and a Secretary. The district for which the Board is to act should be defined, and the composition of the Board must be such as to command the respect, and confidence of the neighbourhood. No member or officer of a Local Board can be admitted to examination.

16. The duties of the Local Boards may be defined as follows:—

(A) To give publicity to the system of Examinations by the circulation of the programmes, hand-bills, &c. (copies of which will be furnished *gratis* on application), and to give encouragement and advice to those young persons who are likely to become candidates.

(B) To hold the Previous Examinations.

(C) To superintend the Final Examinations.

17. Local Boards make no payment to the Society, unless they exercise the power of admitting candidates who are not members of any Institution in union with the Society of Arts (see par 4 C); in which case a subscription of one guinea a year must be paid.

18. A detailed list of each Local Board (giving the exact address of the Secretary) must be submitted to the Council of the Society of Arts before the 1st of February, 1867, when the general list of such Boards will be published; and where a Local Board comprises so large a district that, for the convenience of the candidates, Branch Local Boards have to be formed, lists of these must also be given. All changes in the composition of the Boards must be notified to the Society of Arts.

N.B.—Local Boards may also usefully direct their attention to the holding of Preparatory Examinations in Elementary Subjects, either upon the system described at page 16, or upon any other system that they may prefer.

SUBJECTS FOR THE FINAL EXAMINATION IN 1867.

19. In the following paragraphs will be found brief outlines of the subjects in which candidates may be examined, and their attention is especially drawn to this part of the Programme. In many instances the Examiner has set down certain Text-books; but, in most cases, a candidate may exercise his own judgment as to what Text-book he uses; real knowledge, however or wherever acquired, will be accepted by the Examiners. In the following subjects, however, Political Economy, English History, English Literature, Logic, Latin and Roman History, French, German, Italian, and Spanish, the course of study is necessarily prescribed with more or less exactness.

I.—ARITHMETIC.

Examiner.—Rev. Alexander Wilson, M.A., National Society, London.

20. Practice—Simple and Compound Proportion—Interest—Discount—Insurance—Vulgar and Decimal Fractions; with the principles of a Decimal Notation in money on the basis of the pound unit.

21. The questions framed from the preceding syllabus will consist mainly of practical problems, and the Examiner will take into account not only the correctness of the answers, but also the excellence of the methods by which they are worked out, and the clearness and neatness of the working, *which must always be shown*.

22. Text Books:—Any of the modern treatises on Arithmetic, such as Hunter's Text Book (*National Society*), Colenso (*Longmans*), or Barnard Smith (*Macmillan*).

23. The Examiner, in his remarks on the work done by the candidates on the last occasion, says:—"There are still unmistakable evidences that a little more attention to theory would amply repay the time bestowed upon it."

II.—BOOK-KEEPING BY DOUBLE ENTRY.

Examiners.—John Ball, Esq., of the firm of Messrs. Quilter and Ball, and Robert G. C. Hamilton, Esq., Principal Accountant to the Committee of Council on Education.

24. Candidates should be prepared to answer questions as to the nature and use of the different books usually kept in a merchant's office; to journalise a series of transactions from a waste book, and having posted the entries to the ledger, to balance the accounts, to prove the correctness of the postings by a trial balance, and finally

to exhibit an account of profit and loss, and a balance sheet.

25. Text Books:—Rudimentary Book-keeping (*Weale's Series*). Kelly's Elements of Book-keeping (*Simpkins and Co*). Examination-Questions in book-keeping by Double Entry, by the Rev. J. Hunter, M.A. (*Longmans*).

III.—ALGEBRA.

Examiner.—Professor Sylvester, LL.D., F.R.S.

26. Elementary Operations and Fractions, Simple and Quadratic Equations and Problems leading to them. Involution and Evolution. Surds. Arithmetical, Geometrical, and Harmonic Series. Combinations and Permutations. Binomial Theorem. Scales of Notation. Interest and Annuities. Elementary Theory of Probabilities.

27. Text Books:—Todhunter's Algebra (*Macmillan*), Colenso's Algebra (*Longmans*), Lund's or any other modern treatise on Algebra.

IV.—GEOMETRY.

Examiner.—Rev. B. Morgan Cowie, M.A., Professor of Geometry at Gresham College; one of H.M. Inspectors of Schools.

28. To obtain a first-class certificate, at least six problems and four propositions must be correctly done; to obtain a second-class, at least four problems and six propositions.

29. Text Books:—Euclid, Books I., II., III., IV., VI., XI., as far as Prop. 21. Potts' smaller edition (*Parker*). Green's Euclid's Plane Geometry, practically applied, is a useful help to those who are studying by themselves (*Heywood*, Manchester; *Simpkin, Marshall and Co.*, London).

V.—MENSURATION.

Examiner.—John Sykes, Esq., M.A., Assistant-Secretary to the Committee of Council on Education.

30. The calculation of the areas and circumferences of plane figures bounded by arcs of circles or right lines, and solid contents of cones, cylinders, spheres, &c. Candidates will be expected to be familiar with the different rules for measuring and estimating artificers' work, such as joiners', bricklayers', masons', and plumbers' work, and to be able to prepare estimates of such work from given quantities.

31. Text Books:—Lund's Mensuration, Part III., of his Elements of Geometry and Mensuration. Tate's Mensuration. Young's Treatise on Mensuration (*Simms and McIntyre*).

32. The Examiner, in referring to last year's papers, says:—"The working is in many instances too bare, and would be improved by a few words of explanation. Linear is sometimes confounded with square measure."

VI.—TRIGONOMETRY.

Examiner.—Rev. T. G. Hall, Professor of Mathematics in King's College, London.

33. In Plane Trigonometry, the formulas for the trigonometrical functions of angles, the numerical solution of plane triangles, the use of logarithmic tables, and angular and exponential series.

34. Spherical Trigonometry, Napier's Rules, and the Solution of Spherical Triangles.

35. Text Books:—Snowball's or Todhunter's Trigonometry, Hall's Trigonometry for Schools, for Spherical Trigonometry (*Christian Knowledge Society*), or any other of the modern treatises on Trigonometry. Mathematical Tables (*Chambers' Series*).

VII.—CONIC SECTIONS.

Examiner.—Rev. Bartholomew Price, M.A., F.R.S., Sedleian Professor of Natural Philosophy in the University of Oxford.

36. The properties of the three curves treated geometrically; also as deduced from the cone. The principles of projection, orthogonal and central, applied to derive the properties of the conic sections from those of the circle.

37. Analytical Conics, including the equations of the straight line, the circle, the three conic sections, and the general equation of the second degree.

38. Text Books: Drew's Conic Sections (*Macmillan*). Taylor's Conic Sections (*Macmillan*). Salmon's Conic Sections (*Longmans*). Todhunter's Conic Sections (*Macmillan*).

VIII.—NAVIGATION AND NAUTICAL ASTRONOMY.

Examiner.—Rev. Joseph Woolley, LL.D., Inspector-General and Director of Studies, Royal School of Naval Architecture and Marine Engineering, South Kensington Museum.

39. A good knowledge of Plane and Spherical Trigonometry, of the definitions and terms used in Nautical Astronomy, and of the various measurements of time and their mutual conversions will be required, as well as skill in the use of logarithmic tables, and neatness, order, and accuracy in the numerical solutions of problems.

40. The candidate should understand the construction of charts; the nature and laws of circular storms; great circle sailing, &c.; the methods of determining the latitude, longitude, variation of the compass, and error and rate of a chronometer by astronomical observations, with the demonstrations of the formulæ employed; the use of nautical astronomical instruments, &c.

41. Text Books:—The Nautical Almanac (*Murray*). Riddle's Navigation and Nautical Astronomy (*Lowe*, Essex-street).

42. N.B.—Candidates in this subject should be allowed the use of the Nautical Almanac and Tables during the Examination.

IX.—PRINCIPLES OF MECHANICS.

Examiner.—Rev. Jonathan Bates, M.A., late Fellow of Gonville and Caius College, Cambridge.

43. The properties of matter, solid, fluid, and gaseous.

44. Statics: The composition, resolution, and equilibrium of pressures acting on a material particle, and on constrained particles; machines; attractions.

45. Dynamics: the laws of motion; impact, projectiles; constrained motion; central forces; oscillation.

46. Rigid Dynamics: Motion of a rigid body about a point;—of a free rigid body;—of a system of rigid bodies.

47. Hydrostatics: Pressures of fluids; equilibrium of floating bodies; specific gravity; elastic fluids; machines; temperature and heat; steam; evaporation.

48. Hydrodynamics: Motion and resistance of fluids in tubes, &c.; waves and tides.

49. Pneumatics: Mechanical properties of air; the barometer, and other machines illustrating the mechanical properties of air.

50. Text Books:—Todhunter's Statics, or Parkinson's Mechanics. Goodwin's Mathematics. Miller's, Pear's, or Besant's Hydrostatics. Webster's Theory of Fluids. The treatises on these subjects in Orr's Circle of the Sciences. Golding Bird's Elements of Natural Philosophy, by C. Brooke (*Churchill*). Lardner's Handbooks on Natural Philosophy. Tate's Examples in Mechanics. Baker's Statics and Dynamics (*Weale's Series*). Twisden's Practical Mechanics.

X.—PRACTICAL MECHANICS.

Examiner.—T. M. Goodeve, Esq., Professor of Mechanics at the Royal Military Academy, Woolwich.

51. The applications of the principles of Mechanism to Simple Machines. The Steam Engine.

52. Text Books:—Bourne's Catechism of the Steam Engine (*Longmans*). Scott Russell on the Steam Engine. Nasmyth's Elements of Mechanism, with remarks on Tools and Machinery (*Weale*). Goodeve's Elements of Mechanism, second edition (*Longmans*).

XI.—ELECTRICITY AND MAGNETISM.

Examiner.—Charles Brooke, Esq., M.A., F.R.S.

53. Construction and Properties of Magnets; Magnetic Instruments; Terrestrial Magnetism; The Mariner's Compass; Diamagnetism.

54. Statical or Franklinic Electricity; Voltaic Electricity; Electro-dynamics; Electro-telegraphy; Electrometallurgy; Thermo-Electricity; Organic Electricity.

55. Text Books:—Golding Bird's Elements of Natural Philosophy, by C. Brooke (*Churchill*). Lardner's Handbooks of Natural Philosophy (*Walton and Maberly*). Fleeming Jenkin's report on the Electrical Instruments in Class XIII. of the Exhibition of 1862, for Electro-telegraphy. Jamin, Cours de Physique.

XII.—LIGHT AND HEAT.

Examiner.—Richard Potter, Esq., A.M., late Professor of Natural Philosophy and Astronomy in University College, London.

56. What is the sense of sight?—ancient theories—modern definitions and hypotheses of the nature of light—the special privileges of animals which possess organs of vision—the simple laws or properties of light required to be known before we can discuss the structure of the eye, and the construction of telescopes, microscopes, and other optical instruments—optical images real and virtual—how do they occur in optical instruments.

57. Why do we distinguish between Physical and Geometrical optics?—what are double refraction of light—polarization of light—interference of light—examples of these properties, how shown—phenomena of recurring colours—examples—how are explained the colours of the soap bubble—the colours seen on looking towards a light through the feathers of small birds—the colours of mother-of-pearl—the rainbow, &c., &c.—the laws of the interference of polarized light—to describe cases of these splendid phenomena.

58. What are the definitions of heat, radiant, latent, and sensible?—what is meant by caloric?—hypotheses of the nature of heat—capacity of bodies for heat—the temperature of bodies—how measured by instruments—descriptions of thermometers and pyrometers—the scales of thermometers—how compared—how the volumes of solids, liquids, and gases depend on their temperature—absolute zero of cold—elastic force of vapours and gases produced by heat employed in steam and air engines—winds from the unequal heat of the atmosphere. What are the connexions and analogies of heat and light?

59. Text Books:—The Library of Useful Knowledge. Brewster's Optics (Cabinet Cyclopædia). Potter's Physical Optics, the descriptive and experimental treatise (or first part) (*Walton and Maberly*).

60. The Examiner, speaking of the work done on the last occasion, says:—"The remarks made last year apply in still greater force to the examinations of this year, that the candidates need more study in condensed and accurate methods, so as to enable them to make the best use of their time in examinations."

XIII.—CHEMISTRY.

Examiner.—A. W. Williamson, Esq., F.R.S., Professor of Chemistry, University College, London.

61. Preparation and properties of the chief gases, acids, bases, and salts. Laws of combining proportion by weight and by volume. Analytical processes for the detection and separation of metals, acids, &c. Preparation and distinctive properties of the chief kinds of alcohol, of organic bases, fixed and volatile organic acids, sugars, woody fibre, starch, &c.

62. Candidates are expected to be able to explain chemical reactions by the use of symbols. Questions illustrative of general principles will be selected from the following, amongst other manufactures:—Metallurgy of lead, iron, and copper; bleaching, dyeing, soap-boiling, tanning; the manufacture of coal-gas, sulphuric acid, soda-ash, &c.

63. Text books:—Miller's Elements of Chemistry, Williamson's Chemistry for Students.

64. The Examiner, in his remarks on the papers worked by the candidates on the last occasion, attributes many of the failures to the fact that "chemical theories have of late been so much altered by the great extension

of our knowledge of facts, that many teachers have not yet fully matured their system of instruction in accordance with the theories now prevailing." He confidently anticipates "great benefits to pupils and teachers from the change, when fully carried out—benefits such as have appeared elsewhere."

XIV.—MINING AND METALLURGY.

Examiner.—J. Arthur Phillips, Esq., Civil Engineer, Graduate of the Imperial School of Mines of France, &c.

65. Candidates should be able to identify with facility the ores of the more common metals, and be acquainted with their chemical composition. They should also be familiar with the forms of occurrence of the various metallic ores, and the usual methods employed for their extraction and subsequent purification by crushing, stamping, washing, &c. Underground surveying, the principles of ventilation, particularly as applicable to collieries; a knowledge of furnace assaying, and a general acquaintance with the metallurgy of the more important metals are also required.

66. First-class certificates can be given to those only who have either acquired some practical knowledge of mining, or who possess a special acquaintance with the metallurgy of at least one of the useful metals.

67. Text Books:—Dana's Mineralogy (*Trubner and Co.*, Paternoster-row). Mitchell's Assaying (*Baillière*). Manual of Metallurgy (*Griffin*). Useful metals and their Alloys (*Houlston and Wright*). Ure's Dictionary of Arts, Manufactures, and Mines (*Longmans*). Percy's Metallurgy (*Longmans*). Metallurgy of Iron, Truran (*Spon*).

XV.—BOTANY.

Examiners.—Daniel Oliver, Esq., F.R.S., F.L.S., Keeper of the Herbarium at the Royal Gardens, Kew, and Professor of Botany in University College, London.

68. Sect. I.—The Structure of Plants and Vegetable Physiology. The Functions of the Various Organs, and their Morphological Relations. The Nature of the Principal Tissues. The meaning of Botanical Terms. The application of Structural and Physiological Facts to Practical Purposes.

69. Sect. II.—Systematic Botany. The general Principles upon which the Classification of Plants is based. The distinctive characters of the principal British Natural Orders of Plants. Naming Common Wild Flowers at Sight. The sources of the most important Economic Vegetable Products:—Timbers, Fibres, Fruits, Drugs, &c.

70. Sect. III.—Descriptive Botany. The Art of Describing Plants correctly in Scientific Language.*

71. Text Books:—Lindley's School Botany (*Bradbury and Evans*). Oliver's Lessons in Elementary Botany (*Macmillan*). Lindley's Theory and Practice of Horticulture (*Longmans*). Oliver's Guide to the Kew Museums (pamphlet) (*L. Reeve and Co.*).

72. Candidates will be expected to return three correct answers to questions in Section I., three in Section II., and at least two of the plants must be described and referred to their respective natural orders in Section III.

73. Students are very strongly recommended to the frequent practice of describing plants; at first on forms or "schedules," as given in Professor Oliver's "Lessons," page 59, and, when sufficiently advanced, in detail, as in the examples given at page 293 of the same work, and in Dr. Lindley's "School Botany."

74. The Examiner, referring to last year's papers, observes:—"While of late years much stress has rightly been laid upon the importance of testing candidates in practical and descriptive botany,—testing their knowledge by actual specimens—it will not do to allow this to operate unduly to the detriment of the more purely physiological branches."

* Living plants are provided by the Society for this examination.

XVI.—FLORICULTURE.

Examiner.—Thomas Moore, Esq., F.L.S., Curator of the Botanic Gardens, Chelsea, and Floricultural Director of the Royal Horticultural Society.

75. The candidates will be expected to answer questions on any of the undermentioned subjects:—

76. Improvement of Races in Plants, by what means it can be commenced and carried forward. Hybridization, objects of. Conditions necessary to ensure fertility in Flowers.

77. Warming and Ventilation of Houses for Plant Culture. Influence of Ventilation on Plants confined in forcing houses. Limits of Temperature endurable by Plants, and how to turn this to advantage in Practical Floriculture. Bottom heat, value of in Plant Culture.

78. Watering, the *rationale* of, in the culture of Pot Plants. Liquid Manures, special recommendations of. Food of Plants, how and whence derived, and in what form received.

79. Propagation, the various modes of, and their special adaptations. Vitality of seeds, duration of, and how best preserved. Budding, Grafting, and Inarching, how performed, and to what subjects best adapted. Increase by cuttings and by layers. Leaf-cuttings, how is it that they can organize buds? Composts for various classes of Plants.

80. Acclimatisation. Is it possible to increase the hardness of any race of plants, and what are the most likely means?

81. The leading Flowers of the different seasons, indicating those to be obtained naturally, and those by artificial means.

82. Special Culture.—Ferns, Orchids, Succulents, Heaths, Hardy Annuals, Bedding Plants.

83. Text Books:—Lindley's Theory and Practice of Horticulture (*Longmans*). McIntosh's Book of the Garden (*Blackwood and Sons*). Thompson's Gardener's Assistant (*Blackie and Son*).

84. The Examiner, in his remarks on the work done by the candidates on the last occasion, says they "fail most especially, as a rule, in conveying clearly and concisely the purport of their own replies, and lose force of expression by multiplying words. They are strongly recommended, as a part of their studies, to practice the writing out of short pithy remarks on each of the subjects set down in the programme, comparing their own remarks with the statements in the text books, and repeating this from time to time, cutting out all superfluous words, so that they may get the essential particulars well impressed on the memory."

XVII.—FRUIT AND VEGETABLE CULTURE.

Examiner.—Robert Hogg, Esq., LL.D., F.L.S.

85. Sect. I.—*Fruit-Tree Culture.*—Kinds of Fruits adapted for various soils and exposures. The Propagation, Pruning, and Training of Fruit Trees. The Structure and Functions of the Organs of Trees, considered in their relation to growth and reproduction. The Forcing of Fruit-Trees, and their cultivation under glass, both in and out of pots. The Theory of Ripening, and the principles that ought to regulate the preservation of fruits after they are ripe or their subsequent maturation. The Packing of Fruit for transmission to great distances.

86. Sect. II.—*Vegetable Culture.*—The kinds and quantities of vegetable seeds and roots required for cropping gardens of given dimensions. The most approved mode of culture of the different kinds of vegetables and salads. The preparation of fermenting materials for artificial heating. The forcing of vegetables and salads.

87. Sect. III.—*General Subjects.*—Soils, Water, Atmospheric Air, Light and Heat in their relation to the successful cultivation of Fruit and Vegetables. Manures and their application. The Diseases and Insects to which Fruit Trees and Vegetables are subject, and their remedies. The erection, heating, and ventilation of garden structures.

88. Text Books:—Lindley's Theory and Practice of Horticulture (*Longmans*). The Cottage Gardener's Dictionary (*Bell and Daldy*). Hogg's Fruit Manual, 3rd edition (171, Fleet-street). Rivers' Miniature Fruit Garden (*Longmans*). Bréhaut's Modern Peach Pruner (171, Fleet-street.)

89. The Examiner, in his remarks on the papers worked on the last occasion, says:—"I am pleased to see the rising generation of gardeners devoting themselves to a study of the theory of gardening—to a study of those principles which ought to regulate every gardening operation, and without a perfect knowledge of which there can be no perfect practice. Practice without a knowledge of the principles by which it is governed is an insecure and baseless foundation on which to rest when natural conditions are disturbed or unexpected difficulties arise. I therefore urge on gardeners most strongly the necessity of studying the principles which regulate vegetation; but at the same time I desire also to see the fruits of that study exemplified in the practice, for a knowledge of the theory without the practice is worthless."

XVIII.—ANIMAL PHYSIOLOGY IN RELATION TO HEALTH.

Examiner.—John Marshall, Esq., F.R.S., F.R.C.S., Surgeon to the University College Hospital, and Lecturer on Anatomy at the Government Department of Science and Art.

90. The general principles of Animal Physiology, and the application of them to the preservation of health and to the wants and emergencies of daily life.

91. Text Books:—Carpenter's Animal Physiology, 1859 (*Bohn*). Mapother's Physiology and the Principles of Disease (*Longmans*). Mapother's Lectures on Public Health (*Longmans*). Lardner's Animal Physics (*Walton and Maberly*). Translation of Milne Edwards' Manual of Zoology (*Renshaw*). Marshall's Descriptions of the Human Body, with Atlas (*Day and Son*), for details of Anatomy.

92. The Examiner, in his remarks on the last examination, says:—"A juvenile inability to grasp the subject, and a grievous deficiency in spelling, are still noticeable; but they are limited to a smaller number of candidates."

XIX.—DOMESTIC ECONOMY.

Examiner.—Rev. R. Dawes, Dean of Hereford.

93. Questions for Male and Female Candidates.—This subject embraces a knowledge of the practical management of all household matters which tend to the well-being and happiness of domestic life.

94. The essentials of domestic arrangement, according to circumstances, for a healthy and comfortable dwelling; the nutritious properties of food, animal and vegetable; modes of cooking, &c.; fuel and other household stores; weights and measures; keeping of household accounts; domestic expenditure in general; and profitable investment of small savings.

95. Text Books:—Chemistry of Food, by Dr. Lankester. Manual of Domestic Economy, by Tegetmeier. Animal Physiology (*Chambers' Educational Course*). Physiology for Schools, by Mrs. Bray (*Longmans*).

XX.—POLITICAL AND SOCIAL ECONOMY.

Examiner.—Charles Neate, Esq., M.A., M.P., late Professor of Political Economy in the University of Oxford.

96. The examination will be devoted to the study of Civil Government and Social Economy, as set forth in the 3rd and 4th books of Stephens' Commentaries on the Laws of England. N.B.—In order to meet the question of expense as regards this work, candidates are informed that the earlier editions, which are obtainable at a reduced price, may be used, so long as they are not earlier than the 3rd edition.*

* A limited number of copies of the 3rd edition are on sale at Messrs. Wildy and Son's, law booksellers, Lincoln's-inn-gateway, Carey-street, price £1 each.

97. Professor Fawcett's Manual of Political Economy (*Macmillan*) must be studied by those who desire to obtain first-class certificates.

98. Referring to last year's papers, the Examiner says:—"Some of the candidates have only answered the questions referring to political economy proper." He "desires to impress upon the candidates generally the importance of studying the institutions of their country."

XXI.—GEOGRAPHY.

Examiner.—Wm. Hughes, Esq., F.R.G.S., Professor of Geography in King's College, London.

99. Candidates must show a sound knowledge of Elementary Geography, physical and descriptive. Such knowledge must embrace an acquaintance with at least the outlines of the great natural features of the globe, the political division of countries, and the localities of towns and other places of importance. This knowledge will be looked for in fuller extent with regard to the British Islands, and the various portions of the British Empire, than with regard to other countries. The growing importance of the colonial and foreign dependencies of Britain renders a knowledge of their geography now more than ever necessary. The Australian colonies, New Zealand, and British North America, are hence proposed as subjects for more especial study on the part of the intending candidates for the ensuing year's examinations, and their attention is directed to them accordingly. In evidence of the knowledge possessed regarding those regions, the candidate will be required to sketch, from memory, a map of any one of the Australian or North American colonies that may be named by the examiner. Such sketches need not possess accuracy of detail, but should at least show the general direction of coast-lines, mountain-chains, or river-courses, with the localities and names of the principal towns.

100. Candidates who aim at the highest class of certificate should be also prepared to answer such questions upon Geography in its relation to the Physical Sciences and the History of Mankind, as involve a general acquaintance with the subject of climate, the laws of Meteorology, the Distribution of Plants and Animals over the Globe, the leading outlines of Geology, the Ethnographic Division of the Human Race, and the commercial resources of different lands. This kind of knowledge is looked for, not in place of geographical knowledge of a more elementary kind, but as supplementary to it, and throughout based upon it.

101. Text Books:—Manual of Geography, by William Hughes (*Longmans*). Geography of British History, by William Hughes (*Longmans*). Guyot's Earth and Man (*Parker and Son*). Page's Introductory Text Book of Geology (*Blackwood*). The School Physical Atlas (*either Johnstone's, Phillips's, or that published by the National Society*).

102. The Examiner, referring to the candidates who were unsuccessful last year, says:—"The chief cause of failure appears to lie in the want of methodised study—directed to a definite purpose, and guided by better adjuncts, in the way of books and maps. . . . Mere school-boy knowledge (which is all that a large number of the answers exhibit) will neither secure the higher awards of the Society, nor be attended by the fruitifying influences which information of larger scope—acquired by gradual and systematically-organised stages—exerts on the mind of the true student. Upon these and other points, I would strongly urge upon intending candidates a closer attention to the conditions and suggestions offered in the programme."

XXII.—ENGLISH HISTORY.

Examiner.—The Rev. J. S. Brewer, M.A., Professor of Modern History in King's College, London.

103. English History and English Constitutional History.

104. Text Books:—Manual of English History, by Ross; or The Student's Hume. Creasy's English Constitution.

105. Special subject:—The reign of Charles I. Lingard.

XXIII.—ENGLISH LITERATURE.

Examiner.—Rev. Samuel Clark, M.A., Chairman of the Board of Examiners.

106. Any two, but not more than two, of the authors in the following list may be taken up for examination:—Shakspeare—Hamlet; Henry V.; The Tempest. Milton—Paradise Lost, Book I.—VIII. Butler—The Analogy, Part I. Shaw's History of English Literature, edited by Dr. Smith (published by *Murray*), Chapters I. II., IV., V., VI., VII., VIII., IX., XV., XX., XXII.

107. Candidates are recommended to make a very careful study of the text of the authors they may select. The questions on each author will be divided into two sections, the first intended to test the candidates acquaintance with the text, the second his knowledge of the subject matter, and his critical and literary information. Full marks will not be given for answers in the second section, if those in the first section do not prove satisfactory. No marks will be given for anything beyond answers to the questions.

108. Every candidate will be required to take either Shakspeare or Milton as one of his books.

XXIV.—LOGIC AND MENTAL SCIENCE.

Examiner.—J. D. Morrell, Esq., LL.D., one of her Majesty's Inspectors of Schools.

109. Logic: Candidates will be expected to answer questions on the different processes of thought, and the symbols by which they are expressed. Every Candidate must be prepared to analyse examples of reasoning, and to detect fallacies.

110. Text Books:—Whateley's Elements of Logic, or Morell's Handbook of Logic.

111. A Candidate for a second or third class Certificate will be expected to prepare, in addition, any one of the following books which he may select:—Mill's System of Logic, Book III., Of Induction; Adam Smith's Theory of Moral Sentiments; or Sir William Hamilton's Lectures on Metaphysics, Lectures xx. to xl.

112. A Candidate for a first-class Certificate will be expected to prepare any two of these works which he may select.

XXV.—LATIN AND ROMAN HISTORY.

Examiner.—Rev. F. Temple, D.D., Head Master of Rugby School.

113. Cicero, Tusc. Quæst., Lib. I. Horace, Carm., Lib. I.

114. Roman History to the death of Augustus Cæsar. Text Book:—Liddell's History of Rome, in one volume.

XXVI.—FRENCH.

Examiner.—Alphonse Mariette, Esq., M.A., Professor of French, King's College, London.

115. The Examination Paper will be divided into three parts.

116. The first will comprise grammatical questions and an extract from a modern French writer, to be translated into English. Candidates merely aiming at a 3rd class certificate should confine themselves to this first part.

117. The second part will comprise, together with a few grammatical questions, an English extract to be translated into French, and a list of idiomatic expressions to be rendered from French into English, or *vice versa*. This should be done satisfactorily by the candidate who aims at a 2nd class certificate.

118. In the third part, candidates for a 1st class certificate will have to translate an English extract into French (to which great importance is attached), and to

answer properly (*in French*) some elementary questions on the two following subjects:—

1. French literature during the first 30 years of the present century.

2. The History of France, from the Revolution of 1789 to the restoration of the Bourbons in 1815.

119. Books recommended:—*Mariette: Half-Hours of French Translation (Williams and Norgate, London and Edinburgh)*. Nisard: *Histoire de la Littérature Française*, vol. 4 (*Williams and Norgate*). Duruy: *Histoire de France*, vol. 2 (*Williams and Norgate*).

120. The Examiner, referring to last year's work, attributes the small number of good papers to "the evident neglect by most candidates of the works recommended to their notice in the programme of examinations. As a natural consequence of this neglect, the less elementary questions in Part II., bearing upon some very important and practical features of the French syntax as contrasted with the English, have been left unanswered by the greater number of candidates, and yet every one of those questions is to be found fully explained in the very first pages of one of the books recommended in the programme."

XXVII.—GERMAN.

Examiner.—Dr. Wintzer, Teacher of German in King's College, London.

121. The examination paper will consist of three sections. The first will contain extracts from the works recommended for reading; the second grammatical questions and idioms; and the third English phrases, an extract from an English author (both to be turned into German), questions on a certain period of the history and literature of Germany, and a theme to be worked out in German.

122. Each Candidate must translate at least one of the extracts in section 1, but candidates for first-class certificates two, one from prose, the other from poetry. The latter must also translate well from English into German, answer in German a few questions on the literature and history of Germany, and write a well-expressed essay on a subject which will be announced to them when they come up for examination.

123. Books recommended:—*Schiller's 30-jähriger Krieg* (2nd half of Book II.), *Jungfrau von Orleans* (Prolog und erster Aufzug); *Goethe's Iphigenie* (acts I. and II.); *Kohlrausch's Deutsche Geschichte* (fünfter Zeitraum: Maximilian I. to the end of Mittelalter), and *Vilmar's Geschichte der Deutschen National-Literatur* (Älteste Geschichte, bis 1150).

XXVIII.—ITALIAN.

Examiner.—Signor Pistrucci, Professor of Italian in King's College, London.

124. Candidates for first-class certificates will be required—(1st.) To translate into English passages from some of the principal Italian poets and historians, and to answer the grammatical questions which may be added to those passages. (2nd.) They will also translate into Italian an extract from some English author. (3rd.) And turn a few familiar idioms into their equivalents, from Italian into English, and *vice versa*.

125. For second and third-class certificates candidates will translate into English some selection from Metastasio's *drammi*, and Foscolo or Manzoni's prose works, and answer a certain number of grammatical questions.

XXIX.—SPANISH.

Examiner.—B. B. Aguirre, Esq., Lecturer on Spanish in King's College, London.

126. Candidates for a first-class certificate will have to translate an English passage into Spanish, to render into English or French several idiomatic phrases, and to write in Spanish a short essay.

127. Candidates for a second-class certificate will have to translate from English into Spanish, and to answer several questions upon the Spanish verbs.

128. Candidates for a third-class certificate will have

to translate from Spanish into English, and to answer several grammatical questions.

129. Books recommended:—Spanish *Gil Blas*; *Conquista de Mejico*, por Dn. Jose Morales Santistevan; *Trozos escogidos de los mejores hablistas españoles*, por Dn. Carlos Ochoa; *Estudios filológicos*, por Dn. Manuel Martínez de Morentin.—*Don Quixote* translated into English by Charles Jarvis, Esq.

XXX.—FREEHAND DRAWING.

Examiner.—F. S. Cary, Esq.

130. In freehand drawing the Candidate will be required to show a practical knowledge of the principles usually applied in the imitation of natural and artificial forms, such as furniture, manufactured articles, ornament, foliage, and the human form.

XXXI.—GEOMETRICAL DRAWING.

Examiner.—Thomas Bradley, Esq., Professor of Geometrical Drawing in King's College, London, and at the Royal Military Academy, Woolwich.

131. Practical Geometry, or Geometrical Drawing, required by the Mechanic, Engineer, Builder, and all in any way employed in the arts of construction. The Candidates will be examined in Practical Plane Geometry, the construction of right line figures of given areas, and of curved lines required in the arts, &c.; in Practical Solid Geometry, Elementary Problems on the line and plane, in space, and their combinations, the representation by orthographic projection of simple solids from conditions; in the principles of Development as used in the construction of Maps, &c.; and in Elementary Perspective Projection as far as it is required by the Architect.

132. Text Books:—Geometry, Plane, Solid, and Spherical (*Library of Useful Knowledge*) is especially recommended as a work to be studied on Theoretical Geometry.—*Elements of Geometrical Drawing*, published by the Committee of Council on Education, 2 parts (*Chapman and Hall*).—*Hall's Elements of Descriptive Geometry* for students in Engineering. *Heather's Descriptive Geometry*. Also the following French Works:—*Eléments de Géométrie Descriptive*, par S. F. Lacroix; *Traité de Géométrie Descriptive* par Lefebvre de Fourcy; *Nouveau Cours raisonné de Dessin Industriel*, par Armengaud, aîné, et Armengaud, jeune, et Amoureux; *Bardin's Works on Descriptive Geometry*.

133. The Examiner, speaking of the work done last year, says:—"The practical geometry of the line and plane is not sufficiently studied; most candidates seem to consider plane geometry as constituting the most important branch of the subject; as regards application in the arts, the reverse is the truth—plane geometry is of little use except as ancillary to solid. No one can be considered as tolerably grounded in this subject who could not construct every question in this division of the paper."

XXXII.—THEORY OF MUSIC.

Examiner.—John Hullah, Esq.

134. Notation, the modern modes, intervals, time signatures, the stave, transposition, modulation, terms and characters in common use.

135. The Elements of Harmony.

136. Musical History and Biography.

137. Arrangements must be made, in the Previous Examinations by the Local Boards, to test Candidates, by oral examination, in their knowledge or appreciation of the *sound* of musical successions and combinations. A form of the test to be used for this purpose by the Local Boards at the Previous Examination, will be sent by the Council to such Local Boards as may apply for it, in due time before the Examination.

138. The Examiner, referring to the last examination, says:—"Future candidates should bear in mind that wordy encomiums on great composers present no test whatever of acquaintance with musical history."

PRIZES FOR 1867.

THE PRINCE CONSORT'S PRIZE.

139. His Royal Highness the late President of the Society was pleased to offer annually to the candidate who, obtaining a certificate of the first-class in the current year, shall have obtained in that year and the three years immediately preceding it, the greatest number of such certificates, a PRIZE of TWENTY-FIVE GUINEAS, and this Prize Her Majesty the Queen has graciously intimated her intention to continue. This Prize cannot be taken more than once by the same candidate. It will be accompanied by a certificate from the Society of Arts, setting forth the special character of the Prize, and the various certificates for which it was granted.

GENERAL PRIZES.

* * * None of these Prizes will be awarded to a Candidate who does not obtain a Certificate of the First-class in the subject.

1. Arithmetic (F)	{ First Prize, £5. Second Prize, £3.	17.*Fruit and Vegetable Culture	{ First Prize, £5. Second Prize, £3.
2. Book-keeping (F)	{ First Prize, £5. Second Prize, £3.	18. Animal Physiology in relation to Health (F) ..	{ First Prize, £5. Second Prize, £3.
3. Algebra	{ First Prize, £5. Second Prize, £3.	19. Domestic Economy (F) ..	{ First Prize, £5. Second Prize, £3.
4. Geometry	{ First Prize, £5. Second Prize, £3.	20.*Political and Social Economy (F)	{ First Prize, £5. Second Prize, £3.
5. Mensuration	{ First Prize, £5. Second Prize, £3.	21.*Geography (F)	{ First Prize, £5. Second Prize, £3.
6. Trigonometry	{ First Prize, £5. Second Prize, £3.	22. English History (F) ..	{ First Prize, £5. Second Prize, £3.
7. Conic Sections	{ First Prize, £5. Second Prize, £3.	23. English Literature (F) ..	{ First Prize, £5. Second Prize, £3.
8. Navigation and Nautical Astronomy	{ First Prize, £5. Second Prize, £3.	24. Logic and Mental Science	{ First Prize, £5. Second Prize, £3.
9. Principles of Mechanics	{ First Prize, £5. Second Prize, £3.	25. Latin and Roman History	{ First Prize, £5. Second Prize, £3.
10. Practical Mechanics ..	{ First Prize, £5. Second Prize, £3.	26. French (F)	{ First Prize, £5. Second Prize, £3.
11. Electricity and Magnetism	{ First Prize, £5. Second Prize, £3.	27. German (F)	{ First Prize, £5. Second Prize, £3.
12. Light and Heat	{ First Prize, £5. Second Prize, £3.	28. Italian (F)	{ First Prize, £5. Second Prize, £3.
13. Chemistry	{ First Prize, £5. Second Prize, £3.	29. Spanish (F)	{ First Prize, £5. Second Prize, £3.
14.*Mining and Metallurgy	{ First Prize, £5. Second Prize, £3.	30. Freehand Drawing (F) ..	{ First Prize, £5. Second Prize, £3.
15.*Botany	{ First Prize, £5. Second Prize, £3.	31. Geometrical Drawing (F) ..	{ First Prize, £5. Second Prize, £3.
16.*Floriculture	{ First Prize, £5. Second Prize, £3.	32. Theory of Music (F) ..	{ First Prize, £5. Second Prize, £3.

SPECIAL PRIZES.

140. The whole of the General Prizes are offered to female candidates on the same terms as to male candidates; and, in each of the subjects marked F, an additional prize of £2 is offered by the Society of Arts to the *female* candidate who gets the highest number of marks with a certificate of the first-class. This special prize may be taken with, or apart from, any other prize.

141. In addition to the First and Second Prizes in Mining and Metallurgy offered by the Society of Arts, Sir Thomas Phillips, F.G.S., Chairman of the Council, offers a Third Prize of £2, and three prizes of books value £1 each, to candidates taking First-class Certificates in that subject.

142. In addition to the First and Second Prizes in Political and Social Economy offered by

* For extra prizes in these subjects see paragraphs 141, 142, 143, 144, and 145.

the Society of Arts, Mr. Harry Chester, a vice-President of the Society, offers a Third Prize of £2, and three prizes of books value £1 each, to candidates taking First-class Certificates in that subject.

143. In addition to the Prizes in Geography, offered by the Society of Arts to candidates taking certificates of the First-class, the President and Council of the Royal Geographical Society offer an additional prize of £5 to the candidate who, taking any grade of certificate in Geography, shall obtain the highest number of marks in that subject.

144. In addition to the prizes in Botany, in Floriculture, and in Fruit and Vegetable Culture offered by the Society of Arts to candidates taking certificates of the First Class, the Council of the Royal Horticultural Society offers three additional Prizes of £5, £3, and £1 respectively to the three candidates who, taking any grade of certificate in Botany, obtain the highest number of marks in that subject; also two additional prizes of £5 and £3 respectively, to the two candidates who, taking any grade of certificate in Floriculture obtain the highest number of marks in that subject; also two additional Prizes of £5 and £3 respectively to the two Candidates who, taking any grade of Certificate in Fruit and Vegetable Culture, obtain the highest number of marks in that subject. These prizes are offered only to Candidates who are *bond fide* professional gardeners.

145. In addition to the Prizes in Floriculture, and in Fruit and Vegetable Culture, offered by the Society of Arts to candidates taking certificates of the First Class, the Proprietors of the *Gardener's Chronicle* offer three additional Prizes of £3, £2, and £1 respectively, for the three candidates, being *bond fide* professional gardeners, who, obtaining a Second-class certificate, at least, in Floriculture or Fruit and Vegetable Culture, shall obtain the highest number of marks in one of these subjects, and also a Second-class certificate, at least, in Book-keeping or Mensuration.

LOCAL EDUCATIONAL BOARDS.

The following is a List of the places at which Local Boards have already been formed, with the names of the Secretaries, from whom intending Candidates and others may obtain information relative to the Examinations:—

LOCAL BOARDS.		SECRETARIES.
Aberdeen	Mr. Jas. Sinclair, Mechanics' Institution, Aberdeen.	Carlisle Mechanics' Institute
Aldershot and Farnham District	Mr. Barrow Rule, M.C.P., Principal of the Classical and Mathematical School, Aldershot.	Chatham, Rochester, Stroud, and Brompton
Alton	Mr. T. Bryant.	Chelmsford
Ashford	Mr. T. Nesbit, 3, Dover-place, Ashford.	Christchurch
Banbridge (Ireland) Literary and Mutual Improvement Society	Mr. Alexander Black, Banbridge, County Down, Ireland.	Darlington
Banbury	Mr. John H. Beale, Banbury.	Deptford
Barnet	Mr. John Thimbleby, Barnet.	Derby
Belfast	Rev. W. C. McCullagh, Ballysillan, Belfast.	Devonport
Bessbrook (Newry)	Mr. Wm. J. Wonfor, Bessbrook.	East Lancashire Union of Mechanics' Institutions, Burnley
Birmingham and Midland Institute	Mr. Edwin Smith, Institute, Birmingham.	" Haslingden ..
Bishop's Stortford	Mr. F. Woodham Nash, B.A., Sion House, Birchanger, Bishop's Stortford.	" Rawtenstall ..
Blandford	Mr. J. B. Green, architect, &c., Salisbury-street, Blandford.	Faversham
Bradford	Mr. James Simpson, Mechanics' Institution, Bradford.	Gilford (Ireland) Young Men's Mutual Improvement Society
Brighton (for Sussex) ..	Mr. Barclay Phillips, 75, Lansdowne-place, Brighton.	Glasgow Athenæum
Bristol	Mr. R. W. C. Ross, Athenæum, Bristol.	Glasgow Institution
Burrage-road (Plumstead) Evening Classes	Mr. Josiah Hammond.	Glasgow Mechanics' Institution
Bury St. Edmund's	Mr. John Jackson, Head Master of the Commercial School, Bury St. Edmund's.	Glasgow Popular Evening Classes, Andersonian University
Canterbury	Mr. W. D. Furley, Canterbury.	Halifax Working Men's College
		Hastings and St. Leonard's
		Hertford
		Mrs. Jane Williamson, Mechanics' Institute, Carlisle.
		Mr. F. Butler, 112, High-street, Chatham.
		Mr. W. Cutts and Mr. Jesse Garrood, Chelmsford.
		Mr. W. Judd, F.C.S., High-street.
		Mr. C. Jackson, Darlington.
		Mr. T. Earland, 2, Wellington-grove, Greenwich-road.
		Mr. H. M. Holmes, Hon. Local Sec. to the Society of Arts, London-road, Derby.
		Mr. W. Mogg and Mr. Samuel Chapple, Mechanics' Institute, Devonport.
		Mr. John Sutherland, Post-office, Burnley.
		Mr. J. Binns, Haslingden.
		Mr. Chas. King, Rawtenstall.
		Mr. Frederick W. Monk, Managing Director of the Faversham Institute.
		Dr. Henry McBride, M.D., Gilford, Co. Down, Ireland.
		Mr. John Allan, 13, Queen-street, Glasgow.
		Mr. John Craig, F.E.I.S., Glasgow Institution, 37, Cathedral-street, Glasgow.
		Mr. W. T. Duncan, 65, St. Vincent-street, Glasgow.
		Mr. Geo. Martin, 11, Great Western-road, Glasgow.
		Mr. Geo. Gibb, Haley-hill, Halifax.
		M. J. Savery, 27, Marina, St. Leonard's
		Mr. J. L. Foster, and Rev. J. Davy, Hertford.

Hitchin	{ Mr. Joseph Pollard, High-down, near Hitchin.	Lockwood	{ Mr. Alfred Lee, Mechanics' Institute, Lockwood.
Hull	{ Mr. P. Blackmore, Young People's Institute, Hull.	London, City of London College, Sussex Hall, London, E.C.	{ Mr. W. H. Hansen, City of London College, Sussex Hall, Leadenhall-street, E.C.
Ipswich	{ Mr. Edwin Barrett, 31, Cornhill, and Mr. Herbert Wright, 44, Handford-road, Ipswich.	London, Royal Polytechnic Institution, Limited.	{ Mr. James Cousens, Royal Polytechnic Institution.
King's Lynn	{ Mr. T. Burton, Checker-street.	„ St. Stephen's, Westminster.	{ Mr. J. Cawood, St. Stephen's School, Westminster.
Lancashire and Cheshire Union:—		London, Metropolitan Association:—	
(Central Board) ..	{ Mr. Thomas Lawton, 3, St. James's-chambers, South King-street, Manchester.	„ Bayswater ..	{ Mr. C. Baker, 15, St. Petersburg-place, Bayswater, W.
„ Accrington	{ Mr. W. Ratcliffe.	„ Clapham	{ Mr. T. Heller, Clapham.
„ Alderley Edge ..	{ Mr. G. W. Ralton, Alderley Edge.	„ Hackney	{ Mr. H. Gray, Working Men's Inst., Triangle, Hackney.
„ Ashton-under Lyne	{ Mr. D. F. Howorth.	„ Lambeth	{ Mr. T. Heller, Hercules' buildings, Lambeth, S.
„ Bacup	{ Mr. Thomas Newbigging, Bacup.	„ Mechanics' Institution.	{ Mr. T. A. Reed, 41, Chancery-lane, W.C.
„ Blackburn	{ Mr. W. G. Prebble.	„ Notting-hill ..	{ Mr. T. Timson, James-street, Notting-hill, W.
„ Bollington	{ Mr. J. Gask, Useful Knowledge Society.	„ Paddington ..	{ Mr. B. Shaw, 8, Cambridge-square, W.
„ Bolton	{ Mr. T. Barton.	„ St. George's & St. James's, Westminster	{ Revs. P. S. Duval, G. B. Macilwain, & Mr. G. Pickett.
„ Burnley	{ Mr. J. H. Scott.	„ St. Margaret's and St. John's	{ Mr. V. Borradaile, St. Mary's Parsonage, Vincent-sq.
„ Bury	{ Mr. C. M. Merchant.	„ St. Thomas, Charterhouse Evening Classes	{ Mr. G. Phillipson, St. Thomas' Charterhouse School.
„ Chorley (Lancashire)	{ Mr. T. Yates.	„ Spitalfields and Bethnal-green	{ Mr. T. N. Day, Abbey-street School, Bethnal-green, N.E.
„ Clitheroe	{ Mr. J. Whitaker.	„ Stepney Deanery	{ Mr. W. F. Ives, St. John's School, Limehouse.
„ Congleton	{ Mr. G. Pickford, Mechanics' Institution.	Louth	{ Mr. Benjamin Crow, Mechanics' Institution, Louth.
„ Crewe	{ Mr. Thos. Stubbs.	Newcastle - on - Tyne Church of England Institute	{ Mr. M. J. Forster, Maple-terrace, Newcastle-on-Tyne
„ Dean Mills	{ Mr. W. Taylor.	New Swindon	{ Mr. W. L. Fallows, Mech. Inst.
„ Droylsden	{ Mr. James Blackburn, Educational Institute.	Paisley	{ Mr. Charles Dalton Wason, Teacher, St. George's School, Paisley.
„ Farnworth (Bolton)	{ Mr. W. Sermingeour, Farnworth.	Pembroke Dock	{ Mr. T. H. Eastlake, H.M. Dockyard, Pembroke Dock.
„ Freetown (Glossop)	{ Mr. David Taylor, Edward-street, Glossop.	Peterborough	{ Mr. C. T. Cotton, Long-causeway, Peterborough.
„ Galgate (near Lancaster)	{ Mr. W. Parkinson.	Poole	{ Mr. J. E. Rogers, Young Men's Christian Association, Poole
„ Haughton Dale ..	{ Mr. J. F. Fallows.	Portsmouth	{ Mr. A. R. Robinson, 198, Lake-road, Landport.
„ Hyde	{ Mr. W. Gee.	Richmond	{ Rev. W. Bashall, A.M., 3, Cambridge - villas, Richmond-hill, S.W.
„ Macclesfield	{ Mr. W. Jeffery, Park-green, Macclesfield.	Slough	{ Mr. James Chapman, Upton-grove, Slough.
„ Manchester M.I. ..	{ Mr. A. Jarrett.	Southampton	{ Mr. W. Johnson, Athenæum, Southampton.
„ Mossley	{ Mr. Thos. Jackson.	South Staffordshire Union of Educational Institutions.	
„ New Mills (near Stockport)	{ Mr. John Haslam, Working Men's Institute.	„ Bilston	{ Rev. J. W. Bain.
„ Newton Heath ..	{ Mr. S. L. Chadwick.	„ Cradley-heath ..	{ Mr. S. Griffiths.
„ Oldham Lyceum ..	{ Rev. J. Hodgson.	„ Dudley	{ Mr. Smith, Mech. Inst.
„ Oldham Science School	{ Rev. W. Walters.	„ Gold's Hill ..	{ Mr. Thomas Crabtree, Gold's Hill Schools, West Bromwich.
„ Over-Darwen	{ Mr. A. Bradbury, Mechanics' Institution.	„ Kinver	{ Mr. T. Bolton, Hyde House, Stourbridge.
„ Pendleton	{ Mr. J. Harrop, Mechanics' Institution.	„ Oldbury	{ Rev. H. B. Bowlby.
„ Preston	{ Mr. James Dunn, Mechanics' Institution.	„ Pensnett	{ Mr. J. Crompton, Holly Hall Schools, near Dudley.
„ Rusholme Public Hall and Library	{ Mr. E. Wilde.		
„ St. Helen's	{ Mr. W. Thomason.		
„ Salford	{ Mr. W. Noar.		
„ Southport	{ Mr. J. H. Tonge, Athenæum.		
„ Stalybridge	{ Mr. E. B. Newton.		
„ Stockport	{ Mr. S. Robinson, Mech. Inst.		
„ Tottington (Bury)	{ Mr. J. Greenhalgh.		
Leeds Young Men's Christian Association	{ Mr. W. H. Smith, Y.M. Christian Assoc., Leeds.		
Leicester	{ Rev. D. J. Vaughan, St. Martin's Vicarage, Leicester.		
Lichfield	{ Rev. Thomas Dainty, Lichfield.		
Liverpool College	{ Mr. J. Gregory Jones, College, Shaw-st., Liverpool.		

South Staffordshire Union
(continued)

„ Smethwick ..	Mr. F. Talbot, Messrs. Chance's Library, Smethwick.
„ Stourbridge ..	Mr. John Taylor, land agent.
„ Walsall	Rev. J. H. Sharwood.
„ Wednesbury ..	Mr. C. Britten, Market-place.
„ West Bromwich	Rev. J. Whewell.
„ Willenhall ..	Mr. J. Bennett.
„ Wolverhampton	Mr. J. N. Langley, Mowbray House, Wolverhampton.
Wakefield	Mr. W. S. Banks, solicitor, Wakefield.
Waterford	Mr. James Budd, Thomas-street, Waterford.
Wellingborough	Mr. Thomas S. Curtis, Wellingborough.
West Hartlepool	Mr. Thos. Preston Brunton, and Mr. John Thomas Belk, solicitors, West Hartlepool.
Whitby	Mr. W. G. Chiesman.
Wigan	Mr. James Seward, Church-street, Wigan.
Woolwich	Mr. W. D. Keeble, Royal Laboratory, Woolwich.
Worcestershire Union of Educational Institutes	Rev. E. Isaac, Hanley Castle.
York	Mr. F. Marcus, organising master, Worcester.
Yorkshire, West Riding Educational Board :—	Mr. R. Hall, 8, Fossgate, York.

(Central Board) ..	Mr. H. H. Sales, Mechanics' Institution, Leeds.
„ Acomb, near York	Mr. T. Copley, Acomb.
„ Beeston (Leeds) ..	Mr. W. Standeven.
„ Calverley	Mr. Alfred Walton.
„ Eccleshill	Mr. J. T. Baxter, Eccleshill.
„ Farsley, near Leeds	Mr. Arthur Kirk.
„ Garforth (Leeds) ..	Mr. Arthur Woodhead.
„ Halifax Mechanics' Institution ..	Mr. A. C. Foster, Solicitor, 1, Westgate, Halifax.
„ Hebden Bridge ..	Rev. W. Baldwin, M.A., Hebden-bridge.
„ Holbeck	Mr. Geo. Tinker.
„ Hunslet (Leeds) ..	Mr. W. Child, Powell-street, Hunslet.
„ Keighley	Mr. C. D. Hardcastle, Keighley.
„ Leeds, Church Institute ..	Rev. J. F. Wood.
„ „ Mechanics' Institution ..	Mr. J. O. Dayson.
„ Middlesbrough-on-Tees	Mr. W. Taylor, Mechanics' Inst., Middlesbrough-on-Tees.
„ Ossett	Mr. J. W. Greenwood.
„ Otley	Mr. H. J. Newstead.
„ Queensbury (Halifax) ..	Mr. J. W. Quarmby.
„ Reeth	Mr. W. Wilkie.
„ Rotherham ..	Mr. W. Unwin, currier, Rotherham.
„ Scarborough ..	Messrs. Thos. Shields and C. H. Moxey, Mechanics' Institute, Scarborough.
„ Slaidburn (Clitheroe)	Mr. T. D. Jackson, Slaidburn.
„ Stocksbridge (Sheffield) ..	Rev. H. Robertshaw, Stocksbridge.
„ Stockton-on-Tees	Mr. T. W. Hornsby.

Yorkshire Union (continued)

„ Thirsk	Mr. R. D. Carter, Thirsk.
„ Wilsden (near Bingley, Leeds)	Mr. C. Petty, Wilsden.

ELEMENTARY EXAMINATIONS.

The Society of Arts, ever since the establishment of its system of Examinations, has (while abstaining on its own part from examining students in elementary subjects) recommended the District Unions and Local Boards in connection with it, to hold Examinations of this character, as preparatory to the Final Examinations of the Society. In order to aid them in doing this, and at the same time to promote, as far as possible, a uniformity of standard all over the country, the following definite scheme of elementary examinations is recommended for the use of the District Unions and Local Boards. It is in two grades, and the candidates should be allowed to select either grade at their discretion.

LOWER GRADE.

1. Every candidate must be examined in the first four rules of Arithmetic, simple and compound.
2. Female candidates must also be examined in plain needlework.
3. Male candidates must also be examined in *one* at least of the three following subjects:—

- A. A General knowledge of the Gospel History.
- B. The rudiments of English History.
- C. The rudiments of the Geography of England.

4. Fairly good writing and spelling, with good reading of a simple narrative will also be required.
5. A satisfactory examination will entitle the candidate to a certificate (of the Lower Grade) from the District Union or Local Board.

HIGHER GRADE.

1. Every candidate must be examined in Arithmetic, including the Rule of Three, Decimal and Vulgar Fractions.
2. Every female candidate must also show proficiency in needlework.
3. Male candidates must also be examined in *one* at least of the four following subjects:—

- A. The facts of St. Mark's Gospel and the Acts of the Apostles.
- B. A General knowledge of English History, and especially of the reign of Elizabeth.
- C. The Geography of Great Britain and Ireland.
- D. English Grammar.

4. Candidates will be expected to write fairly, spell correctly, and express themselves grammatically.
5. A satisfactory examination will entitle the candidate to a certificate (of the Higher Grade) from the District Union or Local Board.

No candidates under 12 years of age should be admitted to either grade of these examinations.

The Secretary of any District Union or Local Board in connection with the Society of Arts, desiring to adopt this scheme of Elementary Examinations, must apply to the Secretary of the Society of Arts before the *1st of February*, stating the number of *male* and *female* Candidates respectively desiring to be examined in *each* grade. Examination Papers* in the above subjects will

* The uniform Examination Papers afford a common standard of examination; and, to promote uniformity in the application of that standard, special copies of the examination papers, with the number of marks to be awarded for a complete answer to each question, will be printed for the use of the local examiners. Thus, suppose that in a paper there are twelve questions, and that the aggregate number of marks assigned to the paper is 120; the number of marks placed opposite to each of the questions will depend upon their relative difficulty, and the proportion of these marks given by the examiner for the answer of any candidate will depend upon its accuracy and complete-

then be forwarded to him, which of course must be kept secret from the Candidates until the time of the Examination.

These Examinations must, in 1867, be held on the 26th, 27th, and 28th February, after four o'clock, p.m., as follows:—

TUESDAY, 26th February, After 4 p.m.	WEDNESDAY, 27th February, After 4 p.m.	THURSDAY, 28th February, After 4 p.m.
Arithmetic.	English History. Geography.	Gospel History. English Grammar.

The District Unions and Local Boards will understand that they or their own Examiners must look through the Candidates' answers, and award the certificates. When this has been done, a Return, in the following form, must be made to the Secretary of the Society of Arts, who will then forward the proper number of blank Forms of Certificate to be filled up by the Local Board:—

ELEMENTARY EXAMINATIONS, 1867.

Name of Board or }
District Union. }
No. of Centres _____

	HIGHER GRADE.		LOWER GRADE.	
	Examined.	Passed.	Examined.	Passed.
Males				
Females				
Totals				

Any Candidate who has obtained a Certificate of the Higher or Lower Grade in these Preparatory Examinations in Elementary Subjects may, at the discretion of the Local Boards, if not less than sixteen years of age, be "passed" to the Final Examination of the Society of Arts in any of the *special* subjects in which his or her knowledge has been properly tested.

The Council of the Society of Arts, while desiring thus to aid local bodies in promoting elementary education, hope they will prevent the possibility of the elementary certificates awarded by themselves being confounded with the certificates awarded by the Society of Arts.

The foregoing Programme of Examinations is published in a separate form, and may be had *gratis* on application to the Secretary of the Society of Arts.

ness. Supposing a perfect answer to a question to be set down as worth 20 marks, an examiner may award 20, 15, 12, or any less number, according to the merit of the answer. Thus the candidates all over the country, though their papers be tested by different examiners, will be placed as nearly as possible upon an equal footing. No candidate should receive a certificate who does not obtain at least 30 marks in *each* paper, the whole paper being worth 120 marks. In the subjects of reading, writing, spelling, and arithmetic, it is not thought desirable to fix any number of marks as a standard of proficiency. It is important that the same person should examine *all* the candidates in any one subject at any centre.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Delivered on 25th July, 1866.

Par. Numb.	
225.	Bills—New Zealand.
233.	„ Railway Companies' Securities (as amended by Select Committee).
234.	„ Landed Estates Court, &c. (Ireland) (amended).
235.	„ Bills of Sale Act (1854) Amendment.
236.	„ Local Government Supplemental (No. 4).
237.	„ Aberdeen Provisional Order Confirmation.
238.	„ Inclosure (No. 2).
239.	„ Crown Lands (Lords Amendments).
320.	Grand Jury Presentments (Ireland)—Abstracts of Accounts.
408.	Record of Title Office, &c. (Ireland)—Correspondence.
424.	Railway, &c. Bills—Return.
434.	West African Malls—Contracts.
	Jamaica (Disturbances)—Index to Parts I. II. and III.

Patents.

From Commissioners of Patents' Journal, July 27th.

GRANTS OF PROVISIONAL PROTECTION.

Air, compressing—1837—C. F. Dietrich.
Artificial fuel—1871—D. Barker.
Electric telegraph wires, holding suspended—1843—R. Jobson.
Fire, extinguishing—1723—D. and D. Dawson, and T. Broadbent.
Gas—1827—W. G. Walker and R. F. Smith.
Glass, articles of—1857—T. G. Webb.
Granular substances, mixing—1861—W. Thompson.
Hats—1863—J. Richardson and J. Yeomans.
Holders—1839—W. E. Wiley.
Horses, curbing—1847—G. Day.
Horses, unharnessing—1873—W. E. Gedge.
Lift hoist—1845—P. Ellis.
Liquids, raising and forcing—1717—W. E. Newton.
Locks, &c.—1865—W. B. Shorland.
Machinery, lubricating—1853—R. Clough and P. Smith, sen.
Mile posts—1877—J. and E. God.
Mills—1841—W. Thompson and T. Stather.
Motive power—1851—J. Ingamells.
Parturition, instruments for—1763—G. R. Sheraton.
Railways, working the points of—1875—J. J. L. M. Lagarrigue and F. A. Castera.
Screw cutting and threading machines—1219—C. D. Fox.
Ships' rudders—1833—D. Gallafent.
Spinning, mules for—1869—J. McVitie.
Twist and cord—1835—W. E. Newton.
Water, discharging—1855—J. L. Norton and F. L. H. W. Bunger.
Woven fabrics, folding—1849—J. C., and H. Sampson.

INVENTION WITH COMPLETE SPECIFICATION FILED.

Gas—1888—M. A. F. Mennons.

PATENTS SEALED.

278. W. Hersee and G. Smyth.	324. D. Winstanley, jun.
280. B. Farmer.	340. E. Petit.
282. W. R. Harris.	370. E. Price.
286. J. Robertson.	406. W. Clissold.
292. E. R. Wethered.	422. J. H. Burton.
293. S. B. Ardrey, S. Beckett, W. Smith.	426. J. Huggett.
294. L. Sterne.	430. J. Tomlinson.
295. A. Smith.	463. F. R. Wheelodon.
296. J. Ingram and J. Gough.	487. C. Gall.
304. C. Defries.	529. W. E. Newton.
307. C. E. Gajola.	638. W. Clark.
310. W. and J. Woodward.	666. G. Davies.
317. T. Jenks.	673. W. E. Newton.
	911. R. Noake.

From Commissioners of Patents' Journal, July 31st.

PATENTS SEALED.

320. H. C. Lucy.	347. C. V. Walker.
322. W. B. Nation.	354. D. Spink.
323. J. J. and E. Harrison.	369. U. Scott.
325. W. Boase.	380. S. J. Salkeld.
327. W. J. Blinkhorn.	407. J. Higgins.
328. J. C. Patrick.	413. J. Warner.
331. G. Barker and C. Davis.	421. W. R. Lake.
332. H. Larkin and R. Purkis.	425. B. W. Farey.
333. A. V. Newton.	454. J. B. Fenby.
337. W. Mackintosh.	575. G. Haseltine.
345. F. B. Baker.	657. John Bischoff.
346. T. A. G. Willington.	1208. E. J. Beard.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

1842. L. L. J. Fillion.	1888. W. and S. Firth.
1846. M. Meisel.	1892. W. and J. Graham.
1858. J. Boyd.	1910. T. Fellows & H. Hemfrey.